

A List of the Pending Claims:

1. (Original) An isolated nucleic acid encoding a Slo4 polypeptide comprising an alpha subunit of a Slo potassium channel, the polypeptide:
 - (i) forming, with at least one additional alpha subunit, a potassium channel comprising the characteristic of voltage-gating; and
 - (ii) hybridizing under stringent hybridization conditions to a nucleic acid encoding a polypeptide comprising an amino acid sequence of SEQ ID NO:4, wherein the hybridization reaction is incubated at 42°C in a solution comprising 50% formamide, 5x SSC, and 1% SDS, and washed at 65°C in a solution comprising 0.2x SSC and 0.1% SDS.
2. (Original) The nucleic acid of claim 1, wherein the polypeptide specifically binds to antibodies generated against SEQ ID NO:4.
3. (Original) The nucleic acid of claim 1, wherein the potassium channel further comprises the characteristic of rapid activation.
4. (Original) The nucleic acid of claim 1, wherein the nucleic acid encodes a polypeptide comprising an amino acid sequence of SEQ ID NO:4.
5. (Original) The nucleic acid of claim 1, wherein the nucleic acid comprises a nucleotide sequence of SEQ ID NO:3.
6. (Original) The nucleic acid of claim 1, wherein the nucleic acid is amplified by at least one pair of primers that selectively hybridize under stringent hybridization conditions to the same sequence as the primers selected from the group consisting of:
 - 5'-GGCGTCTGCTTGATTGGTGTTAGGA-3' (SEQ ID NO:23)
 - 5'-ATCAAAGTTGAGTTTCCTCCCGAG-3' (SEQ ID NO:24)
 - 5'-CCCGGAGCATCTACCGTACATCTTC-3' (SEQ ID NO:25)
 - 5'-CCAGCTGTTCAAAGTGTATGGGTAG-3' (SEQ ID NO:26)

5'-GCTTGGAGGACCATGTTTCAGGAGT-3' (SEQ ID NO:27)
5'-ATGGTTGATTTGGAGAGCGAAGTG-3' (SEQ ID NO:28)
5'-CAATTTTGAGAGCATGGGCTGTGAAAG-3' (SEQ ID NO:29)
5'-GACTTATGGATCAGAACTTATGCCCAG-3' (SEQ ID NO:30)
5'-CATCTGGTGTAGTTTCATCTTCTGATTGG-3' (SEQ ID NO:31).

7. (Original) The nucleic acid of claim 1, wherein the polypeptide encoded by the nucleic acid comprises an alpha subunit of a homomeric potassium channel.
8. (Original) The nucleic acid of claim 1, wherein the polypeptide encoded by the nucleic acid comprises an alpha subunit of a heteromeric potassium channel.
9. (Original) The nucleic acid of claim 1, wherein the nucleic acid encodes a polypeptide comprising a sequence having at least 60% amino acid sequence identity to an amino acid sequence of SEQ ID NO:4.
10. (Original) An isolated nucleic acid that specifically hybridizes under moderately stringent conditions to a nucleic acid encoding an amino acid sequence of SEQ ID NO:4, wherein the hybridization conditions include incubation at 37°C in a solution comprising 40% formamide, 1 M NaCl, 1% SDS at, and a wash at 45°C in a solution comprising 1X SSC.
- 11-21. (Canceled)
22. (Original) An expression vector comprising the nucleic acid of claim 1.
23. (Original) A host cell transfected with the vector of claim 22.
- 24-69. (Canceled)